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MINDS, BRAINS, COMPUTERS:
AN HISTORICAL INTRODUCTION TO THE FOUNDATIONS OF COGNITIVE SCIENCE

心智、大脑与计算机：
认知科学创立史导论

〔美〕R. M. 哈尼什　著
王　淼　李鹏鑫　译

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[illegible]ii[illegible]Franz Joseph Gall[illegible]1758—1828[illegible]

[illegible]paul Broca[illegible]1842—1880[illegible]Carl Wernicke[illegible]1848—1905[illegible]Korminian Brodmann[illegible]1868—1918[illegible]

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[illegible]iii[illegible]Camillio Golgi[illegible]1843—1926[illegible]“[illegible]”[illegible]Santiago Ramony Cajal[illegible]1852—1934[illegible]“[illegible]”[illegible]

[illegible]20[illegible]Charles Sherrington[illegible]1857—1952[illegible]“[illegible]”[illegible]1950[illegible]

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1913[illegible]J.B.Watson[illegible]1878—1958[illegible]1943[illegible]-[illegible]“[illegible]40[illegible]-[illegible]”[illegible]“[illegible]”[illegible]1913[illegible]158[illegible]

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[illegible]E.Thorndike[illegible]1874—1949[illegible]

[illegible]1911[illegible]“[illegible]”[illegible]41[illegible]

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[illegible]1929[illegible]S[illegible]R[illegible]S-R[illegible]S[illegible]R[illegible]1906[illegible]“[illegible]”[illegible]

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[illegible]B.F.Skinner[illegible]1904—1990[illegible]“[illegible]”[illegible]1931[illegible]“[illegible]”[illegible]42[illegible]“[illegible]”[illegible]“[illegible]”——[illegible]“[illegible]”[illegible]“[illegible]”[illegible]——[illegible]

[illegible]1938[illegible]1[illegible]“[illegible]contigencies of reinforcement[illegible]”[illegible]“[illegible]”[illegible]i[illegible]ii[illegible]iii[illegible]iv[illegible]1[illegible]“[illegible]”[illegible]

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1957[illegible]——[illegible]

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1951[illegible]K.Lashley[illegible]“[illegible]”[illegible]1951[illegible]122[illegible]

[illegible]-[illegible]-[illegible]

S1→R1/S2[illegible]→R2/S3[illegible]→…

[illegible]S-R[illegible]“[illegible]”[illegible]1951[illegible]127[illegible]S-R[illegible]“[illegible]”[illegible]1951[illegible]112[illegible]

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[illegible]（Noam Chomsky）[illegible]1951[illegible]“[illegible]”（Leahey，1992，418）[illegible]

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2.4 [illegible]

[illegible]46“[illegible]”（Leahey，1992，397）[illegible]20[illegible]50[illegible]60[illegible]

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[illegible]·[illegible]George Miller[illegible]1951[illegible]7……[illegible]1956[illegible]“[illegible]-[illegible]”[illegible]Leahey[illegible]1992[illegible]406[illegible]“[illegible]”[illegible]1951[illegible]42[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1967[illegible]41[illegible]“[illegible]”[illegible]1967[illegible]42[illegible]

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[illegible]Galen[illegible]130—200[illegible]4-5[illegible]Nemesius[illegible]390[illegible]

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[illegible]·[illegible]René Descartes[illegible]1596—1650[illegible]32[illegible]5[illegible]54[illegible]

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[illegible]Franz Joseph Gall[illegible]1758—1828[illegible]1796[illegible]Spurzheim[illegible]1776—1832[illegible]1802[illegible]“[illegible]”[illegible]1807[illegible]1810[illegible]1819[illegible]1[illegible]2[illegible]……[illegible]1825[illegible]10[illegible]“[illegible]”[illegible]

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[illegible]·[illegible]paul Broca[illegible]1824—1880[illegible]“[illegible]”[illegible]1861[illegible]Monsieur Leborgne[illegible]“Tan”[illegible]“[illegible]”[illegible]Finger[illegible]1994[illegible]38[illegible]Tan[illegible]Aubertin[illegible]1825—1893[illegible]Society of Anthropology in paris[illegible]“[illegible]”[illegible]51[illegible]30[illegible]“Tan”[illegible]“Tan”[illegible]“Sacre Nom de Dieu[illegible]”[illegible]Tan[illegible]“[illegible]”[illegible]

[illegible]84[illegible]Tan[illegible]——[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]Akmajian et al.[illegible]7[illegible]

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1870[illegible]·[illegible]Carl Wernicke[illegible]1848—1905[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

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[illegible]·[illegible]Eduard hitzig[illegible]1839—1907[illegible]·[illegible]Gustav Fritsch[illegible]1838—1927[illegible]1870[illegible]·[illegible]David Ferrier[illegible]1843—1928[illegible]·[illegible]Korbinian Brodmann[illegible]1868—1918[illegible]52[illegible]

3.4 [illegible]

[illegible]·[illegible]Robert hooke[illegible]1665[illegible]1718[illegible]·[illegible]·[illegible]Anton von Leeuwenhoek[illegible]84[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1820[illegible]“[illegible]”[illegible]“[illegible]”[illegible]Jan purkyne[illegible]1787—1869[illegible]“[illegible]”[illegible]“[illegible]”[illegible]——[illegible]1836[illegible]·[illegible]Gabriel Valentin[illegible]1810—1883[illegible]a “kugeln” or globule[illegible]“[illegible]”[illegible]68[illegible]“[illegible]”[illegible]1837[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1838[illegible]·[illegible]Theodor Schwann[illegible]1810—1882[illegible]“[illegible]”[illegible]

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1991[illegible] 181-2[illegible]

1894[illegible]Croonian Lectures[illegible]
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centres nerveux”[illegible]——[illegible]1909[illegible]
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Young[illegible]1970[illegible]1[illegible]4[illegible]Boring[illegible]1957[illegible]3[illegible]Fodor[illegible]1983[illegible]Corsi[illegible]1991[illegible]3[illegible]5[illegible]

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30.□□□□□□□□□do it□□□□

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[illegible]

[illegible]

[illegible]

31.[illegible]while[illegible]

[illegible]“[illegible]……[illegible]while[illegible]”[illegible]

[illegible]

32.[illegible]

[illegible]

[illegible]“[illegible]”[illegible]

33.[illegible]then[illegible]

“[illegible]then[illegible]”[illegible]

[illegible]

[illegible]“[illegible]owning[illegible]”[illegible]

34.[illegible]put the blue pryamid on the block in the box[illegible]

[illegible]“[illegible]put the blue pryamid which on the block in the box[illegible]”[illegible]“[illegible]put the blue pryamid on the block which is in the box[illegible]”[illegible]

[illegible]

35.[illegible]anything[illegible]every[illegible]it[illegible]

[illegible]“[illegible]every[illegible]”[illegible]“[illegible]any[illegible]”[illegible]“[illegible]some[illegible]”[illegible]“[illegible]……[illegible]”[illegible]“[illegible]……[illegible]”[illegible]“[illegible]it[illegible]”[illegible]“[illegible]”[illegible]

[illegible]

36.[illegible]steeple[illegible]…[illegible]

[illegible]“steeple”[illegible]

[illegible]

37.“[illegible]steeple[illegible]”[illegible]

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38.[illegible]

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[illegible]

39.[illegible]build one[illegible]

[illegible]

[illegible]“[illegible]one[illegible]”[illegible]“[illegible]”[illegible]

40.[illegible]“[illegible]”[illegible]

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41.[illegible]

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42.[illegible]

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43.[illegible]

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44.[illegible]

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5.3 ShRDLU[illegible]

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□IS B1 BLOCK□

□IS B2 pYRAMID□

□AT B1 □LOCATION 100 100 0□□

□SUppORT B1 B2□

□CLEARTOp B2□

□MANIpULABLE B1□

□CONTAIN BOX1 B4□

□COLOR-OF B1 RED□

□ShApE-OF B2 pOINTED□

□IS BLUE COLOR□

□CAUSE EVENT27 EVENT29□

□GRASp B1□

□GET-RID-OF B2□

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5.4 ShRDLU□□□

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6.2 [illegible]

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6.4 [illegible]

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pSs[illegible]（a set of production rules[illegible]A[illegible]B[illegible]（memory work space[illegible]“[illegible]”[illegible]（rule interpreter[illegible]pSs[illegible]

1.[illegible]A[illegible]

2.[illegible]

3.[illegible]B[illegible]

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[illegible]Newell，1973：516[illegible]）

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p1.IF [illegible]On-CL[illegible] ThEN [illegible]put-On-CL[illegible]

p2.IF [illegible]On-CL[illegible] ThEN [illegible]put-On-CL[illegible]

p3.IF [illegible]On-CL[illegible]OR On-CL[illegible] ThEN [illegible]put-On-CL[illegible]

p4.IF □On-CL□15□AND On-CL□□□AND□□On-CL□□□

ThEN □put-On-CL□□□□

p5.IF □On-CL□□ AND On-CL□15□□ ThEN □pub-On-CL□□□

p6.IF □On-CL□15□AND On-CL□□□□ ThEN □put-On-CL□□□

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1.□□□□□□□□□□□□consciousness-of something□□□□□“□□□□awareness of□”□“□□□□attending to□”□□□□□“□□□□□CD□□□□□□□□□□”

2.□□□□meta-consciousness□□□□□“□□□□□higher-order awareness□”□“□□□□meta-awareness□”□“□□□□□internal

access[illegible]”[illegible]“[illegible]attending to[illegible]”[illegible]“[illegible]/[illegible]
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3.[illegible]phenomenal consciousness[illegible]“[illegible]
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4 [illegible]-[illegible]conscious-awakeness[illegible]“[illegible]”[illegible]

5.[illegible]self-consciousness[illegible]“[illegible]self-awareness[illegible]”[illegible]“[illegible]self-conscious[illegible]”[illegible]“[illegible]”[illegible]

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p.S.[illegible]‘[illegible]’[illegible]‘[illegible]
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[illegible]”（Gazzaniga and LeDoux，1978，
148-9[illegible]

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[illegible]（Lackner and Garrett，1972）[illegible]

[illegible]（Visiting relatives can be a bore）[illegible]

[illegible]（I hate relatives who visit often vs.I hate traveling to visit relatives）[illegible]

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20[illegible]60[illegible]“[illegible]”[illegible]·[illegible]

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[illegible]“[illegible]”（input systems，ISs）[illegible]（sensory transducers）[illegible]3[illegible]（central systems，CSs）[illegible]

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[illegible]Fodor（1983）[illegible]“[illegible]”（input systems，ISs）[illegible]“[illegible]（natural kind）”[illegible]ISs[illegible]“[illegible]”[illegible]——[illegible]ISs[illegible]——[illegible]

ISs[illegible]ISs[illegible]（specific domain）[illegible]（mandatory）[illegible]ISs[illegible]ISs[illegible]ISs[illegible]ISs[illegible]（fast）[illegible]（informationally encapsulated）[illegible]-[illegible]（Miiller-Lyer）[illegible]ISs[illegible]（shallow output）[illegible]217[illegible]“[illegible]”[illegible]（specific neural structures）[illegible]ISs[illegible]ISs[illegible]（characteristic breakdown patterns）[illegible]

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2.[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1983[illegible]13[illegible]“[illegible]……[illegible]”[illegible]1983[illegible]13[illegible]

3.[illegible]1[illegible]2[illegible]219[illegible]“‘[illegible]’[illegible]”[illegible]Fodor[illegible]1983[illegible]23[illegible]

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Anderson□1993□□□□Klahr et al.□1987□□□□□□□-pS□pS-
inspired□□Soar□□□□□□□Laird et al.□1987□□□Newell□1990□□
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Farmer□1984□□Bever□1992□□□Segal□1996□□□□□□□□□□□
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[illegible]T2[illegible]

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[illegible]“[illegible]Winograd[illegible]ShRDLU……[illegible]Weisenbaum[illegible]ELIZA……[illegible]”[illegible]1980[illegible]417[illegible]“[illegible]”[illegible]“[illegible]”[illegible]——[illegible]understanding[illegible]about[illegible]“[illegible]”[illegible]

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[illegible]pof I[illegible]

[illegible]1980[illegible]417[illegible]

[illegible]“[illegible]”[illegible]Lisker and Abramson[illegible]1964[illegible]Forster[illegible]1978[illegible]1[illegible]2[illegible]p of I[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]1980[illegible]418[illegible]

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2.[illegible]……[illegible]1980[illegible]418[illegible]

[illegible]

[illegible]“[illegible]”[illegible]1980[illegible]423[illegible]——[illegible]“[illegible]”[illegible]1980[illegible]422[illegible]-[illegible]-[illegible]

[illegible]——[illegible]1980[illegible]423[illegible]“[illegible]”[illegible]——[illegible]“[illegible]‘[illegible]’[illegible]……[illegible]‘[illegible]’[illegible]……[illegible]……[illegible]”[illegible]1980[illegible]423[illegible]“[illegible]……[illegible]……[illegible]……[illegible]”[illegible]1980[illegible]423-4[illegible]

9.3 [illegible]

[illegible]DCTM[illegible]DCTM[illegible]

[illegible]

[illegible]·[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”（1980[illegible]

[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]subsystem[illegible]”[illegible]“[illegible]”[illegible]“[illegible]‘hamburger’[illegible]‘[illegible]’[illegible]‘[illegible]’”（1980[illegible]“[illegible]”（Rey，1986，173[illegible]“[illegible]”[illegible]“[illegible]”[illegible]·[illegible]“[illegible]”[illegible]·[illegible]——[illegible]·[illegible]“[illegible]”[illegible]

[illegible]

[illegible]——[illegible]“[illegible]direct[illegible]about[illegible]”（1980，424[illegible]DCTM[illegible]DCTM[illegible]——[illegible]“[illegible]robot[illegible]”[illegible]TV[illegible]

[illegible]“[illegible]”[illegible]DCTM[illegible]DCTM[illegible]1980，420[illegible]——[illegible]DCTM[illegible]

[illegible]“[illegible]”[illegible]
[illegible]-[illegible]-[illegible]syntactic-plus-semantic[illegible]
[illegible]
[illegible]——[illegible]“[illegible]
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[illegible]“[illegible]TV[illegible]
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[illegible]——[illegible]“[illegible]
[illegible]quasi-pictorial[illegible]”[illegible]Kosslyn[illegible]1980[illegible]
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[illegible]”[illegible]1980b[illegible]431[illegible]
[illegible]——[illegible]“[illegible]
[illegible]awareness[illegible]……[illegible]”[illegible]1980[illegible]
454[illegible]1[illegible]
[illegible]2[illegible]——[illegible]
[illegible]“[illegible]”[illegible]3[illegible]
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[illegible]1[illegible]2[illegible]

[illegible]4 [illegible]1[illegible]4[illegible]

[illegible]Churchlands[illegible]1991[illegible]“[illegible]”[illegible]
[illegible]
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[illegible]1 [illegible]

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[illegible]“[illegible]”[illegible]——[illegible]——[illegible]

[illegible]“[illegible]”[illegible]（Chalmers，1996a， 327）[illegible]

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2.[illegible]

3.[illegible]

4.[illegible]

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9.4 DCTM[illegible]II[illegible]

[illegible]——[illegible]“[illegible]”[illegible]

——[illegible]Dennett，1978b）

[illegible]DCTM[illegible]“[illegible]”[illegible]higher-order[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

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[illegible]aware of[illegible]（consciousness of[illegible]

[illegible]TV[illegible]“[illegible]”[illegible]meta-
cognition[illegible]“[illegible]”[illegible]penrose[illegible]1989[illegible]410[illegible]“[illegible]”[illegible]

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[illegible]phenomenology[illegible]qualitative character[illegible]experiential aspects[illegible]“[illegible]qualitative feel[illegible]——[illegible]”[illegible]Chalmers[illegible]1996b[illegible]4[illegible]“[illegible]”[illegible]——[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]”[illegible]“[illegible]qualia[illegible]”[illegible]——[illegible]——[illegible]

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[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

——[illegible]Russell[illegible]1918[illegible]55[illegible]

[illegible]Jackson[illegible]1986[illegible]——

[illegible]——[illegible]——[illegible]

[illegible]

[illegible]“[illegible]blindsight[illegible]”[illegible]“[illegible]”[illegible]“[illegible]‘[illegible]‘[illegible]’[illegible]‘[illegible]’[illegible]……[illegible]……[illegible]‘[illegible]’”[illegible]Weiskrantz[illegible]1988[illegible]188[illegible]

[illegible]“[illegible]……[illegible]‘[illegible]’[illegible]……[illegible]”[illegible]

DCTM[illegible]

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[illegible]“[illegible]Full-blown consciousness[illegible]”[illegible]

[illegible]1[illegible]being aware of something in the environment[illegible]2[illegible]3[illegible]——[illegible]aware of its awareness[illegible]meta-awareness[illegible]

[illegible]non-sensory[illegible]——[illegible]like to be[illegible]——[illegible]cognitive qualia[illegible]

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2.[illegible]←[illegible]

[illegible]8[illegible]

[illegible]

[illegible]Ⅱ[illegible]

[illegible]7[illegible]——[illegible]8[illegible]“[illegible]”[illegible]DCTM[illegible]stand for[illegible]——[illegible]DCTM[illegible]DCTM[illegible]DCTM[illegible]

[illegible]Levine[illegible]1983[illegible]“[illegible]”[illegible]Chalmers[illegible]1996b[illegible]“[illegible]”[illegible]

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[illegible]Churchland and Sejnowski[illegible]1992[illegible]

[illegible]McGinn[illegible]1991[illegible]1993[illegible]“[illegible]……[illegible]……[illegible]——[illegible]”[illegible]1993[illegible]5-6[illegible]

[illegible]Searle[illegible]1992[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]1992[illegible]1[illegible]

[illegible]Chalmers[illegible]1996b[illegible]“[illegible]”[illegible]1996b[illegible]161[illegible]“[illegible]……[illegible]”[illegible]1996b[illegible]164[illegible]“[illegible]”[illegible]1996b[illegible]170[illegible]“[illegible]”[illegible]“[illegible]”[illegible]

[illegible]qualitative consciousness[illegible]——[illegible]-[illegible]psychophysical laws[illegible]

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3.[illegible]“[illegible]”[illegible]

[illegible]“[illegible]dispositional beliefs[illegible]”[illegible]“[illegible]Dennett[illegible]”[illegible]“[illegible]standing beliefs[illegible]”[illegible]“[illegible]”[illegible]

[illegible]Searle[illegible]1990b[illegible]1992[illegible] [illegible]7[illegible]3[illegible]“[illegible]”[illegible]

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9.5 DCTM□□□□□

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“[illegible]·[illegible]Winston Churchill[illegible]·[illegible]‘[illegible]’[illegible]……[illegible]‘[illegible]’[illegible]”[illegible]1981[illegible]1[illegible]

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“[illegible]……[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]

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“[illegible]（Doppelganger）——[illegible]——[illegible]……[illegible]‘[illegible]’[illegible]h2O[illegible]XYZ[illegible]XYZ[illegible]……[illegible]‘[illegible]’[illegible]XYZ……[illegible]‘[illegible]’[illegible]h2O……[illegible]……[illegible]‘[illegible]’[illegible]……[illegible]‘[illegible]’[illegible]”（1975b，228-9）。

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10.2 Jets & Sharks

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10.3 NETtalk

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A-E□ 1×-0.25=-0.25

B-E□-1×0.25=-0.25

C-E□-1×0.25=-0.25

D-E□1×-0.25=-0.25

□=-1.00

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A-E□ 1×□0.25□□0.25

B-E□-1×0.25□□0.25

C-E□0×0.25□0

D-E□1×□0.25□□0.25

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A-E□-1×0 =0

B-E□1×0=0

C-E□-1×0.5=-0.5

D-E□1×-0.5=-0.5

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A-F□ -1×-0.5□0.5

B-F□1×0.5□0.5

C-F□-1×0□0

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□iii□□□□□□□□□0+0.25=0.25□

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A-E□ 1×1×0.25+0= 0.25

B-E□-1×1×0.25+0=-0.25

C-E□-1×1×0.25+0=-0.25

D-E□ 1×1×0.25+0=0.25

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D-E□1×1×0.25=0.25+0.25=0.5

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2.[illegible]“[illegible]”[illegible]

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□Rumelhart and McClelland□1986a□□1□□□5□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□8□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□Delta□□□□□□□□□□□□□hinton□1992□□□□□□□□□□□□□□□□□□□□□□□□□□□

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12.3 CCTM[illegible]

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12.5 pTC

McLaughlin “ folk psychology intentional ascriptions intentional realism 338

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[illegible]fault tolerance[illegible]graceful degradation[illegible]——[illegible]Dennett[illegible]“[illegible]·[illegible]……[illegible]——[illegible]——[illegible]”[illegible]1991[illegible]269[illegible]

[illegible] [illegible]

[illegible]1969[illegible]1948[illegible]unorganized machines[illegible]——“[illegible]”——[illegible]Copeland and proudfoot[illegible]1996[illegible]“A-[illegible]”[illegible]“B-[illegible]”[illegible]“p-[illegible]”[illegible]

A-[illegible]

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13.1 [illegible]

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13.2 CCTM[illegible]

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Fp[illegible]“[illegible]‘100[illegible]’[illegible]”[illegible]1988[illegible]54-5[illegible]CCTM[illegible]100[illegible]“100[illegible]”[illegible]“[illegible]”[illegible]

[illegible]“[illegible]”[illegible]1988[illegible]56[illegible]“[illegible]VAX[illegible]VAX[illegible]virtual address extension[illegible]——[illegible]‘[illegible]’[illegible]”[illegible]1988[illegible]55[illegible]“[illegible]……[illegible]……hillis[illegible]1985[illegible]”[illegible]1988[illegible]55-6[illegible]CCTM[illegible]VAX“[illegible]”[illegible]VAX[illegible]hillis[illegible]connection machine[illegible]——[illegible]0[illegible]1[illegible]

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Fp[illegible]“[illegible]（damage-resistance）[illegible]”（1988：52）[illegible]

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（i）R[illegible]

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Fp[illegible]“[illegible]（varying magnitudes）[illegible]‘[illegible]’[illegible]‘[illegible]’[illegible]（stochastic）[illegible]”（1988：54）[illegible]“[illegible]”，Fp[illegible]“[illegible]”（1988：54）[illegible]

4.[illegible]

Fp[illegible]“[illegible]-[illegible]-[illegible]”（1988：57）[illegible]“[illegible]”[illegible]（Smolensky，1988，[illegible]6[illegible]

5.[illegible]“[illegible]-[illegible]”[illegible]

Fp[illegible]“[illegible]……[illegible]‘[illegible]’[illegible]‘[illegible]’[illegible]

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Fp[illegible]“[illegible]‘[illegible]’[illegible]”[illegible]1988[illegible]60-1[illegible]

[illegible]CCTM[illegible]

[illegible]1—5[illegible]——[illegible]Fp[illegible]CCTM[illegible]11[illegible]2[illegible]4[illegible]6[illegible]CCTM[illegible]McLaughlin and Warfield[illegible]1994[illegible]CCTM[illegible]DCTM[illegible]“[illegible]”[illegible]1994[illegible]392[illegible]

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Fp[illegible]“[illegible]”[illegible]CCTM[illegible]1[illegible]3[illegible]5[illegible]7—11[illegible]“I[illegible]”[illegible]Fp[illegible]“I[illegible]”[illegible]Fp[illegible]“[illegible]”[illegible]

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[illegible]“[illegible]”[illegible]——[illegible]implementation theory[illegible]——[illegible]“[illegible]”[illegible]McLaughlin[illegible]1993[illegible]184[illegible]

13.4 CCTM[illegible]

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13.5 CCTM□□□□

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